ST ALBANS HIGH SCHOOL FOR GIRLS

YEAR 7
ENTRANCE EXAMINATION
MATHS
January 2017

Time allowed: 1 hour and 15 minutes

First Name: …………………………………………………………

Surname: …………………………………………………………

Date of Birth: …………………………………………………..

Instructions for Candidates:

- Work steadily but quickly through the paper, taking care to be as accurate as possible
- Show working where appropriate. Answers without full working may not gain any credit
- You may write in pencil or pen
- No calculators or rulers may be used
- There are 43 questions in the paper. Always check that you have turned over the page and that you have not missed any pages
- Do not open this paper until told to start

◯	△	▢	Total

1. Add 74 + 37

Answer……………………….

2. Subtract 345 - 54

Answer……………………….

3. Add 19.3 + 0.84

Answer……………………….

4. Multiply 18 x 9

Answer……………………….
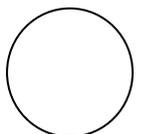
5. Divide 301 ÷ 7

Answer……………………….

6. Write in figures the number *eighteen thousand and forty-six*

Answer……………………….

7. Write in words 3,060,120

Answer……………………………………………………………………………………………

…………………………………………………………………………………………………

8. Work out $\frac{1}{7}$ of 21

Answer…………………………..

9. Work out one third of one quarter of 252

Answer…………………………..
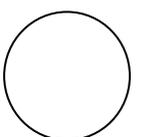
10. You are told that 123 x 45 = 5535

Use the above to work out:

a.   123 x 450   …………………...

b.   1.23 x 45   …………………...

c.   12.3 x 4500   …………………...

d.   55.35 ÷ 45   …………………...

11. Work out:

a. 50% of 160

Answer...…………...

b. 25% of 2000

Answer ……………..

c. 28% of 200

Answer ……………..

12.

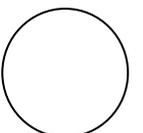$$2\%, \quad \frac{1}{5}, \quad \frac{222}{1000}, \quad 0.202$$

Write down which of the numbers above is

a. The smallest

………………………

b. The largest

………………………

13. Write down **one** number that is **both**

a. Even **and** prime

Answer……………………..

b. Odd **and** square

Answer……………………..

c. A factor of 28 bigger than 1 **and** a factor of 21 bigger than 1
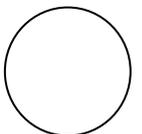
Answer……………………..

d. Smaller than 20 **and** has exactly three different factors

Answer……………………..

14. Paulina and Simon have baked 5 cakes each to sell at a tea party. Paulina sells $4\frac{3}{4}$ cakes and Simon sells $2\frac{1}{4}$ cakes.

How much more cake does Simon have left than Paulina?

Answer……………………..

15. Gita wants to form a 4 digit number where the first and last digits are both prime.   What are the largest and smallest numbers that Gita can form?

Repeated digits are allowed.

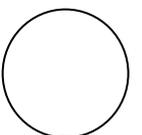Largest…………………………….

Smallest…………...…………….

16. Imogen buys

- 4 star stickers at 15p per sticker
- 7 moon stickers at 16p per sticker

If Imogen pays with a £5 note how much change would Imogen get?

Answer £……………………….

17. The temperature of water in a tank is decreasing at $3°C$ per minute. If the bath starts with a temperature of $48°C$, after how long will the temperature reach $15°C$?

Answer………………………..minutes

18. If   a □ b   means the remainder when a + b is divided by 10
    eg. 7 □ 8 = 5

    Write down the value of
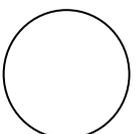
    a. 5 □ 9   …………...

    b. 2 □ 3   …………...

    c. 33 □ - 6   ……………

19. The number of stinging nettle plants in Mr Beefshaw's rose patch doubles each year. In 2016 there are 8 stinging nettle plants. In which year will the number of stinging nettle plants first be more than 1000?

Answer………………………..

7

20. A theatre has seats arranged in rows of 22. If an audience of 483 fills the rows one by one, leaving no empty seats, how many rows will be full?
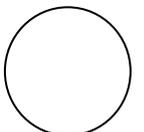
Answer………………………rows

21. A concert hall contains 2800 seats. A model of the hall is made so that it looks exactly the same but 50 times smaller.

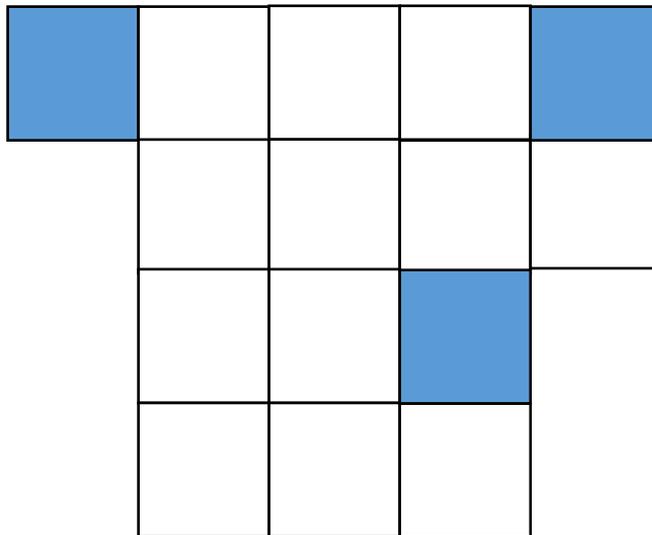a. If the hall is 100m long, how long will the model be?

Answer……………………..   m

b. How many seats will there be in the model?

Answer………………………seats
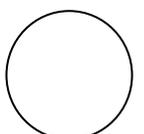
22.

a. What fraction of the shape is shaded?

Answer………………………

b. Shade more squares so that $\frac{2}{3}$ of the shape is shaded altogether.
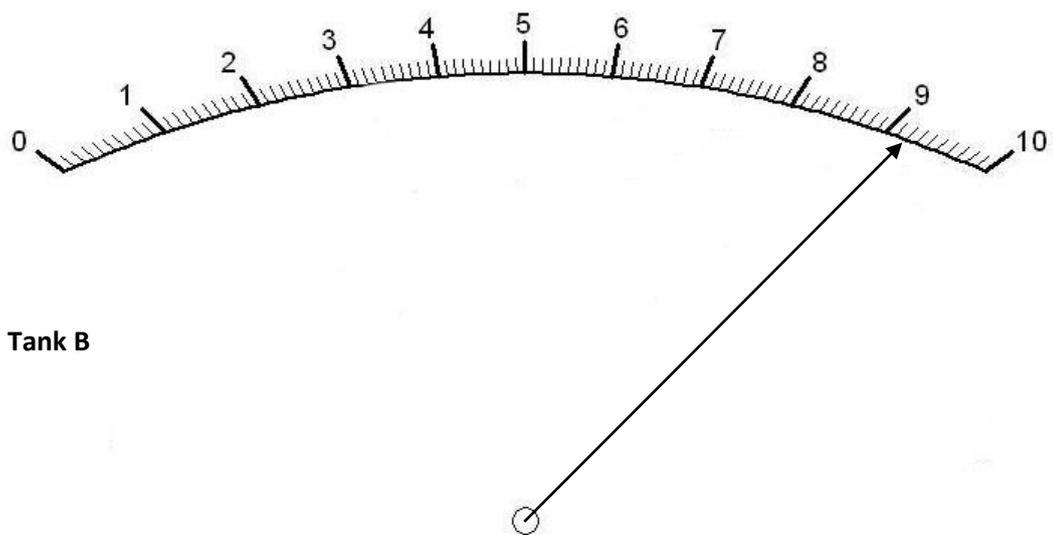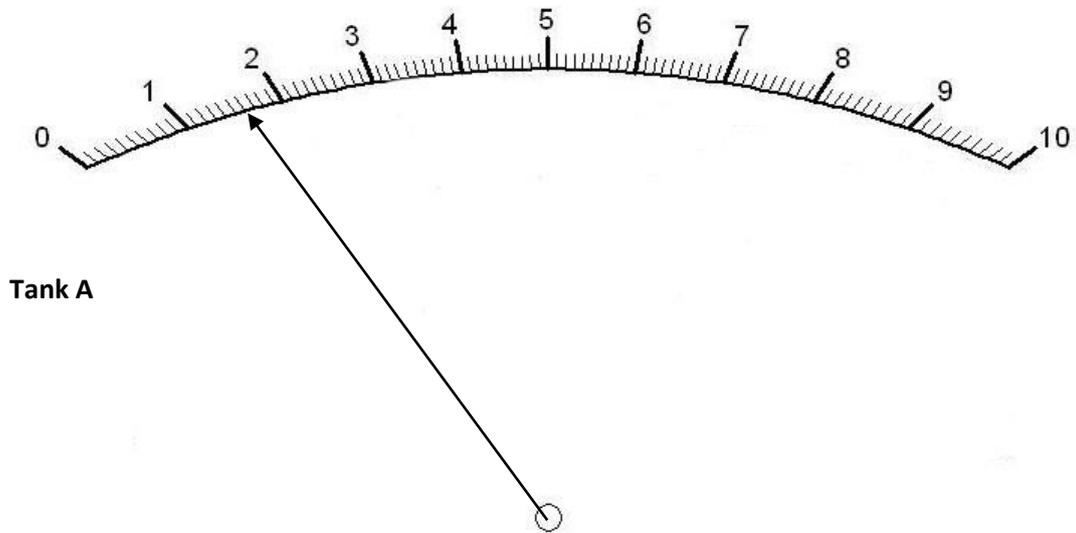
23. In this addition sum, A and B stand for digits.

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  8 3 5 A
+   A B 2
---------
  B 1 4 B
```

Find the values of A and B.

A …………….. B ……………..

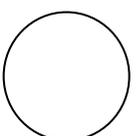24. The scales show how much water is stored in tanks A and B.

Tank A

Tank B

a. How much water is in tank A?

Answer………………………litres

b. Tank B contains more water than tank A. How much **more** water is in tank B?

Answer………………………litres

c. Water is now allowed to flow out of tank B until it contains 3.2 litres.

Draw an arrow on scale B to show the new measurement.

25. Jason takes 4 hours to cycle 24 kilometres. If Jason always cycles at the same speed, after how many hours has Jason cycled 15 kilometres?
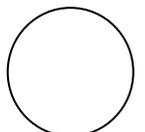
Answer………………………. hours

26. Write the next number in each of the lists below

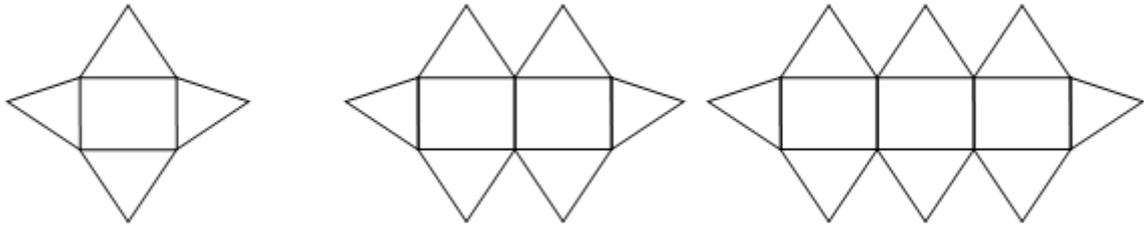a. 3   7   11   15   19   ………

b. 4   9   16   25   36   ………

c. 23   19   13   5   -5   ………

27. Here is a sequence of patterns.

a.   How many triangles are there in the pattern with 3 rectangles?

…………….. triangles

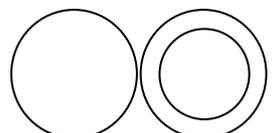b.   How many triangles would there be in a pattern with

i) 5 rectangles?

…………….. triangles

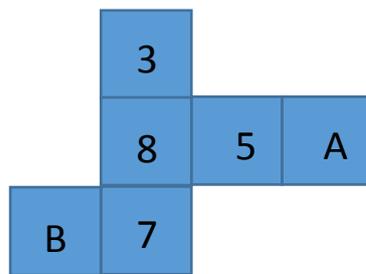ii) 10 rectangles?

…………….. triangles

c.   How many **rectangles** would there be in a pattern with 34 **triangles**?

…………….. rectangles

28. A cube is unfolded so that its faces form the shape shown below. When the cube is folded up the numbers on opposite faces add up to 10.
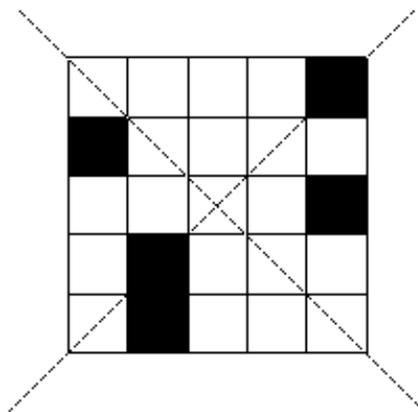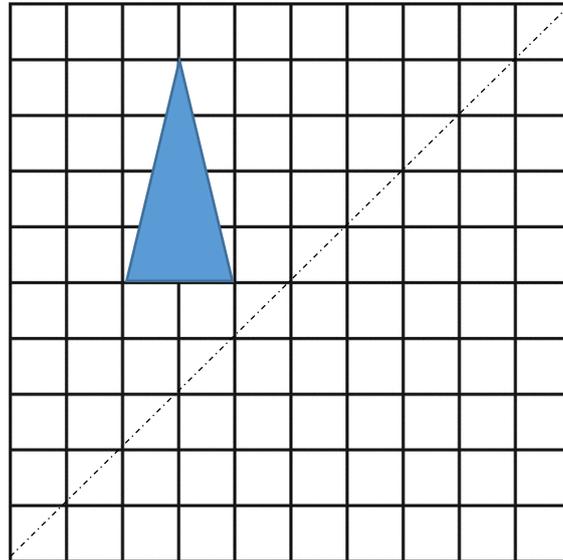
What are the missing numbers?

	3		
	8	5	A
B	7		

A = …………… and B = ……………..

29. Two angles in a triangle are 30° and 40°. Find the third angle.
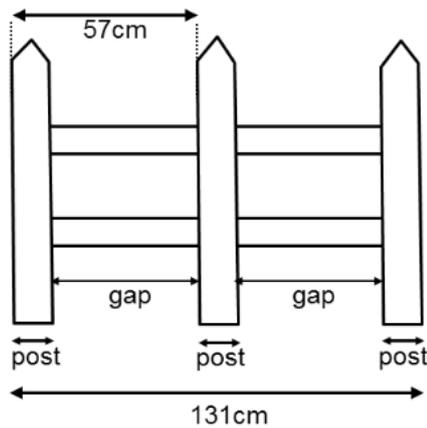
Answer…………………….°

30. Shade the smallest number of squares so that the two dotted lines become lines of symmetry (mirror lines) of the completed diagram.

31. Reflect the shape in the dotted line.

32. In this fence the posts are all the same width as each other. The gaps are all the same width as each other, too.
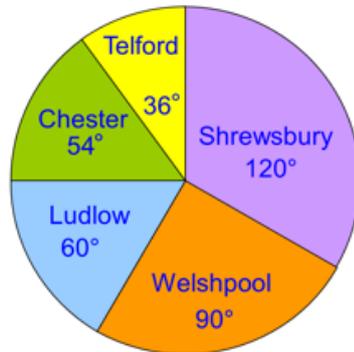
How wide is each gap?

Answer............................ cm

33. 240 passengers boarded a train in Birmingham. The pie chart shows the percentage of the passengers who travelled to Shrewsbury, Welshpool, Ludlow, Chester and Telford.

Work out how many passengers travelled to the following three places:

Welshpool…………………………………

Ludlow……………………………..

Chester……………………………..

34. This chart shows the number of goals scored in a season by four teams

🌕 Represents 10 goals

a. How many goals were scored altogether?

Answer……………. goals

b. How many **more** goals were scored by the Shooters than the Raiders?

Answer………….. goals

35. A, B and C are numbers.

The mean of A and B is 40

The mean of B and C is 35
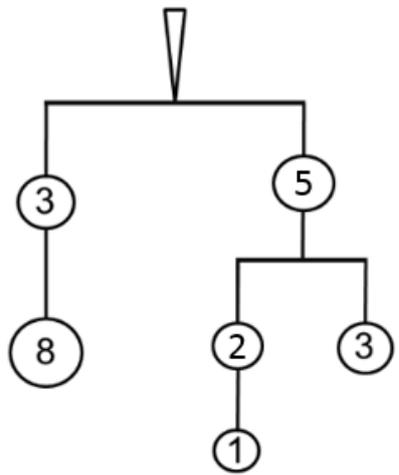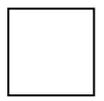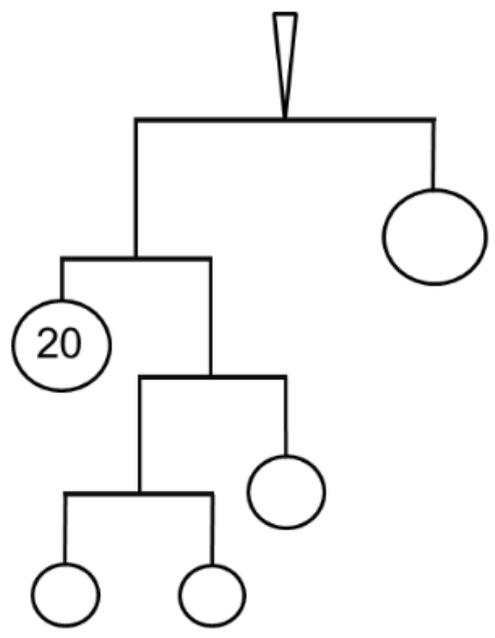
All three numbers add up to 100

What are A, B and C?

A ……………..   B ……………..   C ……………..

36. Here is a balanced mobile

Put numbers in the circles to make this one balance.

37. Sholto has 40 helium balloons. Some of the balloons are red, some are blue and some are green. There are three times as many green balloons as there are red balloons and there are twice as many blue balloons as there are green balloons.

How many balloons are blue?

Answer……………………….. Balloons

38. I think of a number. I multiply my number by 9 and add 5 to the result. The answer is 50. What is my number?

Answer……………………….

39. Jacqueline and Sophia stand facing one another. At exactly the same moment both girls start to turn steadily on the spot.

It takes Jaqueline 3 seconds to make one full turn, whilst Sophia takes 4 seconds to complete one full turn.

How many times will Jaqueline have turned when the girls are next facing each other?

Answer……………………….turns

40.

$$\triangle + \triangle + \triangle + \square + \square = 16$$

$$\triangle + \triangle + \square = 9$$

Find $\triangle + \square = \ldots\ldots\ldots\ldots$

Find $\square = \ldots\ldots\ldots\ldots$

41. A **square** number is what we get if we multiply a whole number by itself. A **cube** number comes from multiplying a number by itself and then by itself again. So 9 is a square number because 9 = 3 x 3, and 8 is a cube number because 8 = 2 x 2 x 2.

I is both a square and a cube because I = I x I and I = I x I x I. Find another number **bigger than 0** that it both a square and cube number.

Answer……………………..

42. The diagram below is a *Venn Diagram*. Amy needs to write some numbers inside the circles. Any number written inside one circle is a factor of 12 and any number inside the other circle is a factor of 16. Two numbers have already been written in for you. Help Amy to complete the diagram.

Factors of 12

Factors of 16

6

2
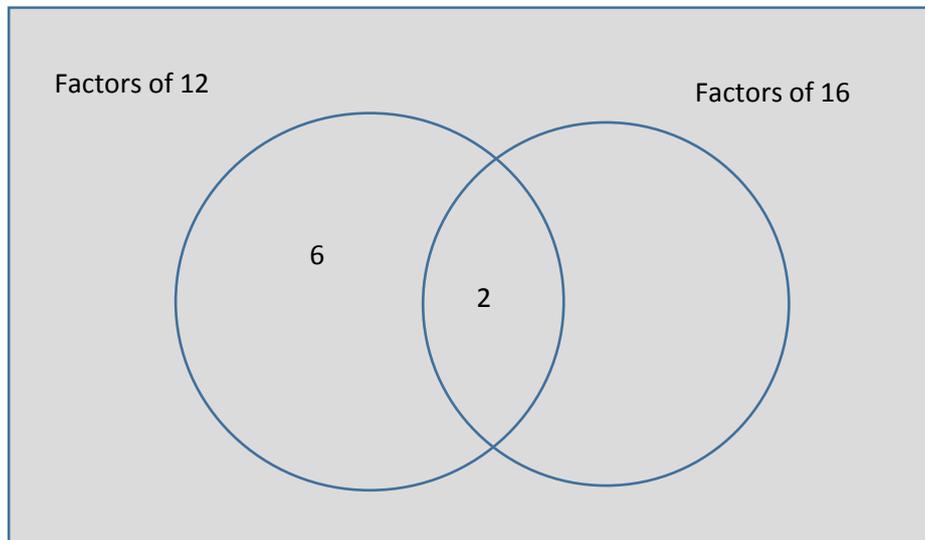
43. Three people stand in a line in order A B C. The people then change positions in the line so that **no one person is left standing in the same position as they were to start with**.
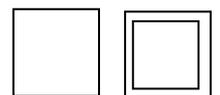For example C A B.

a. What is the only other possible order?

☐ ☐ ☐

b. This process is now repeated with four people, A B C D.

The people then change positions in the line so that, again, **no one person is left standing in the same position as they were to start with**.

How many possible ways are there of doing this? Use any space on the next page that you need to.

Answer……………………….

THE END

Now go back and check your work.